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(54) **SLIP BASE STRUCTURE WITH CLIP DEVICE**

(75) Inventors: **Jung Gon Sung**, Goyang-si (KR); **Duk Geun Yun**, Goyang-si (KR); **Man Gi Ko**, Gongju-si (KR); **Kee Dong Kim**, Gongju-si (KR)

(73) Assignees: **Korea Institute of Construction Technology**, Goyang-si (KR); **Kongju National University Industry-University Cooperation Foundation**, Gongju-si (KR)

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E01F 9/011 (2006.01)

(52) **U.S. Cl.** **404/10**; 404/9; 40/612

(58) **Field of Classification Search** 40/606.01, 40/606.14, 612; 404/9, 10; 49/49
See application file for complete search history.

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Primary Examiner — Gary S Hartmann
(74) *Attorney, Agent, or Firm* — John K. Park; Park Law Firm

(57) **ABSTRACT**

The present invention relates to a structure for supporting a road support including: a base plate fixedly disposed on ground in such a manner as to be spaced apart by a predetermined distance from the surface of ground; a slip plate slidably disposed on the top surface of the base plate; a coupling body protruded upwardly from the center portion of the top surface of the slip plate in such a manner as to be insertedly coupled to the inner lower end portion of a support body; and a plurality of clips each having an approximately '⊏' or 'C'-like shape so as to receive the edges of the base plate and the slip plate thereinto, each of the plurality of clips having a fixing bolt fastened to a female screw passed through the top end portion thereof so as to compressedly support the top surface of the slip plate.

4 Claims, 9 Drawing Sheets

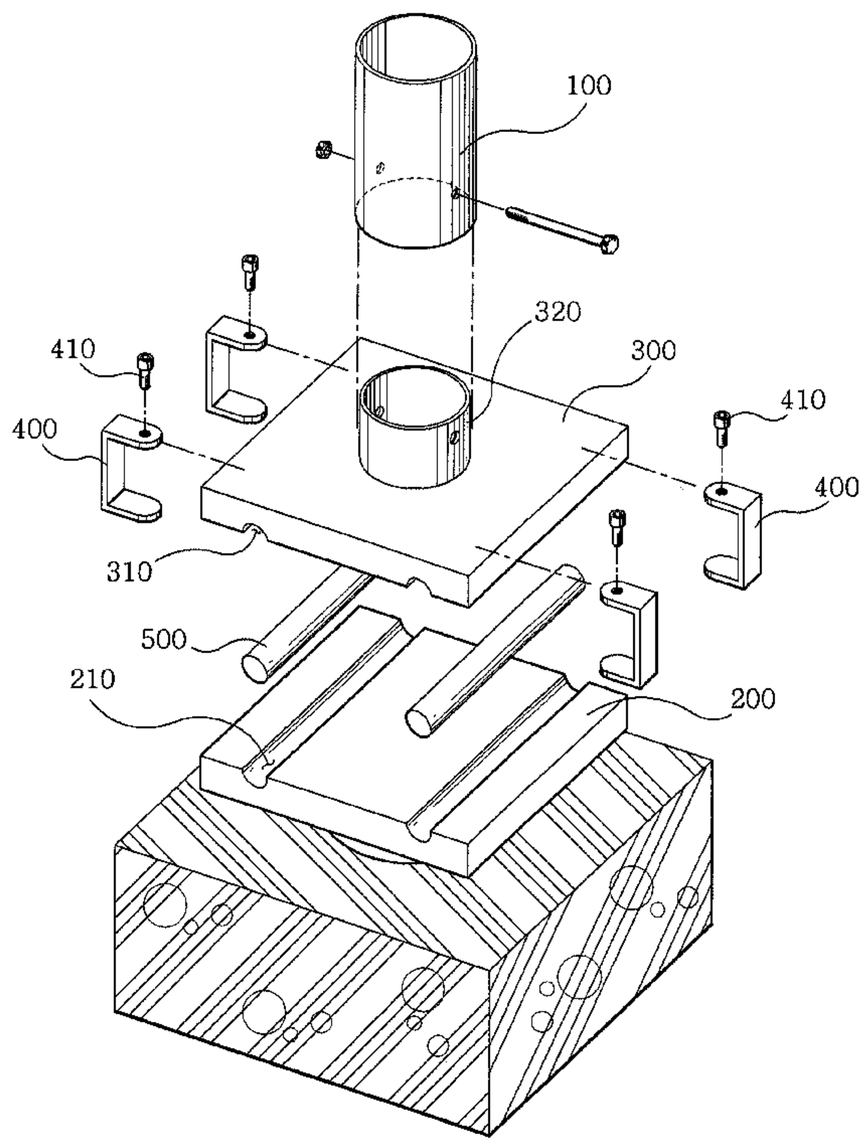


Fig.1A

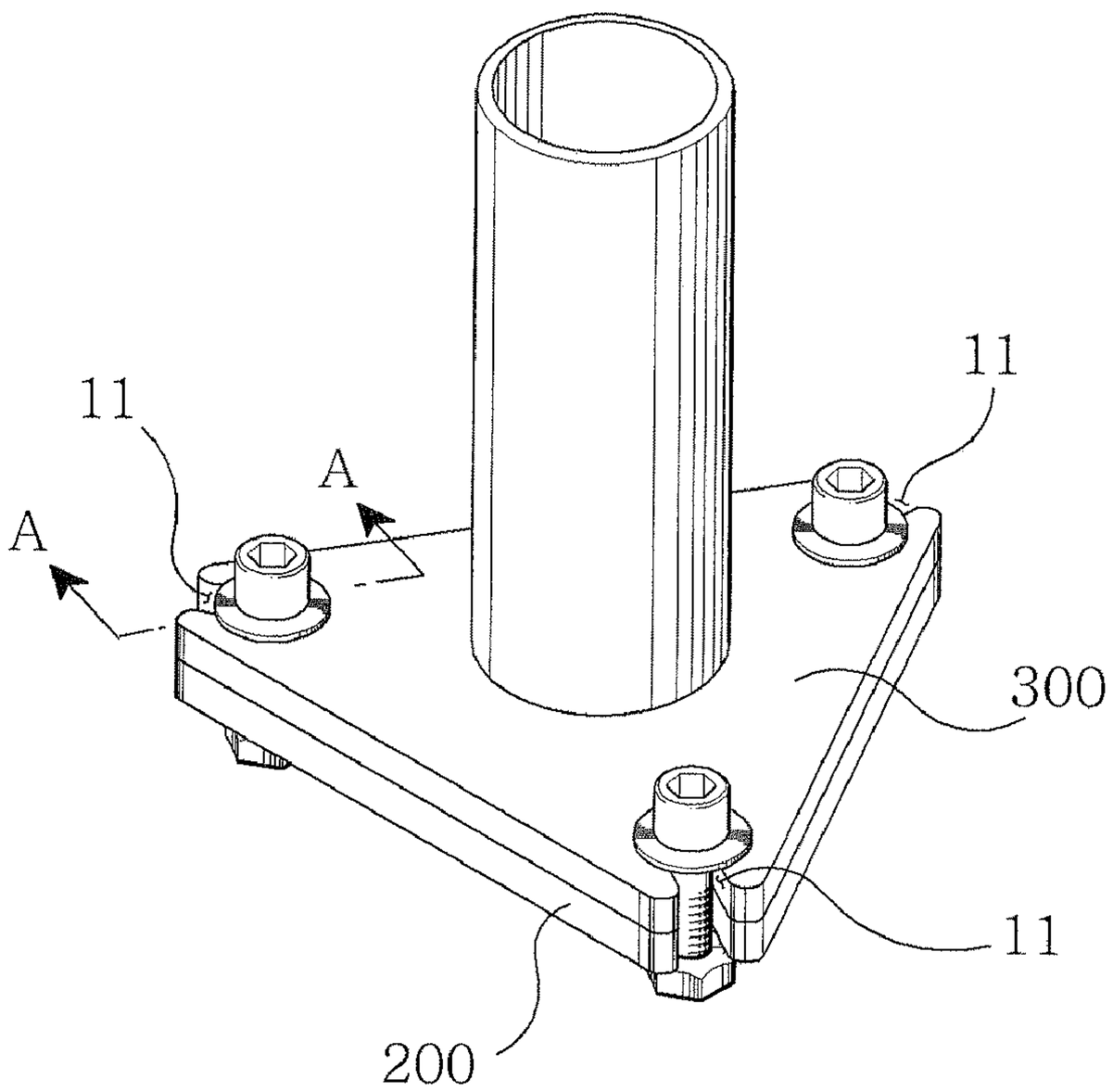
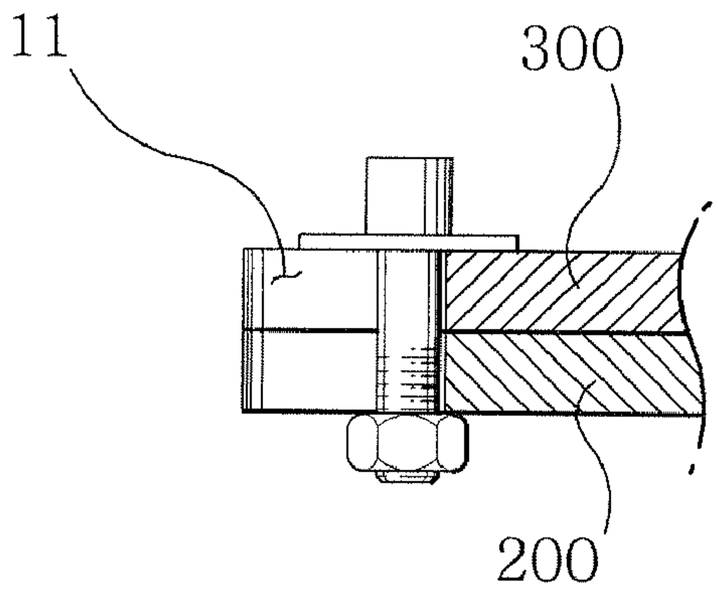


Fig.1B



SECT A-A

Fig.2

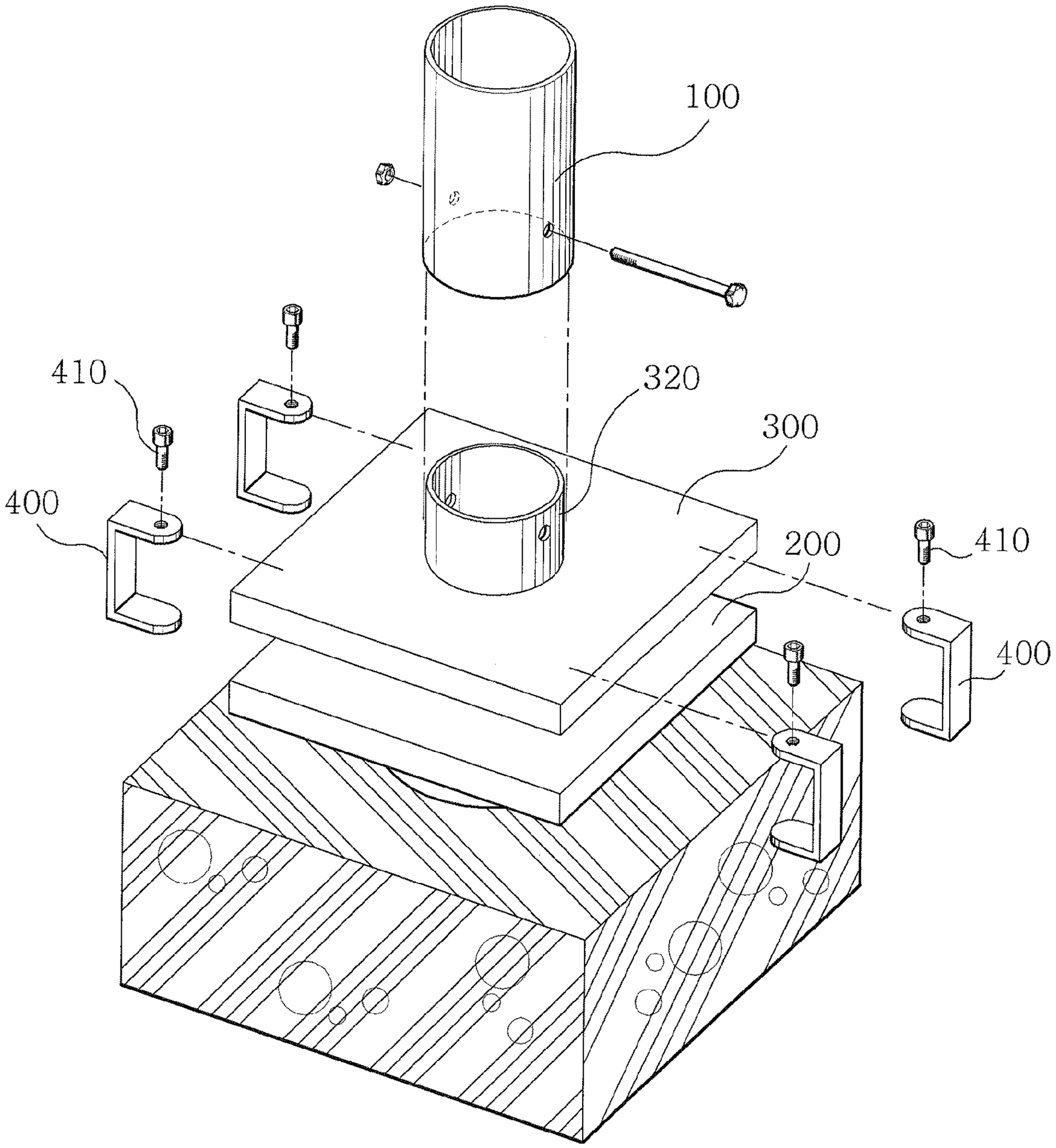


Fig.3

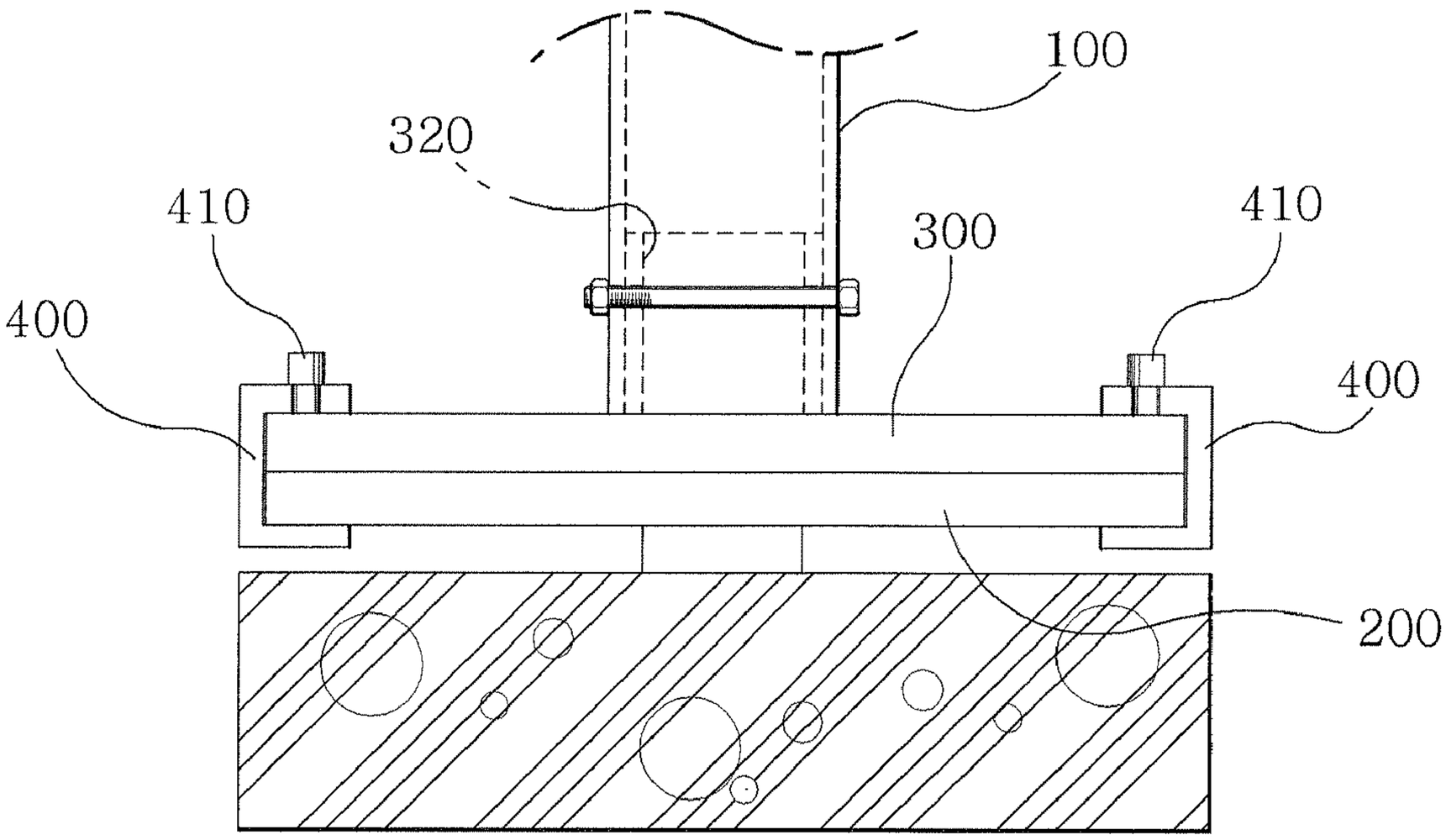


Fig.4

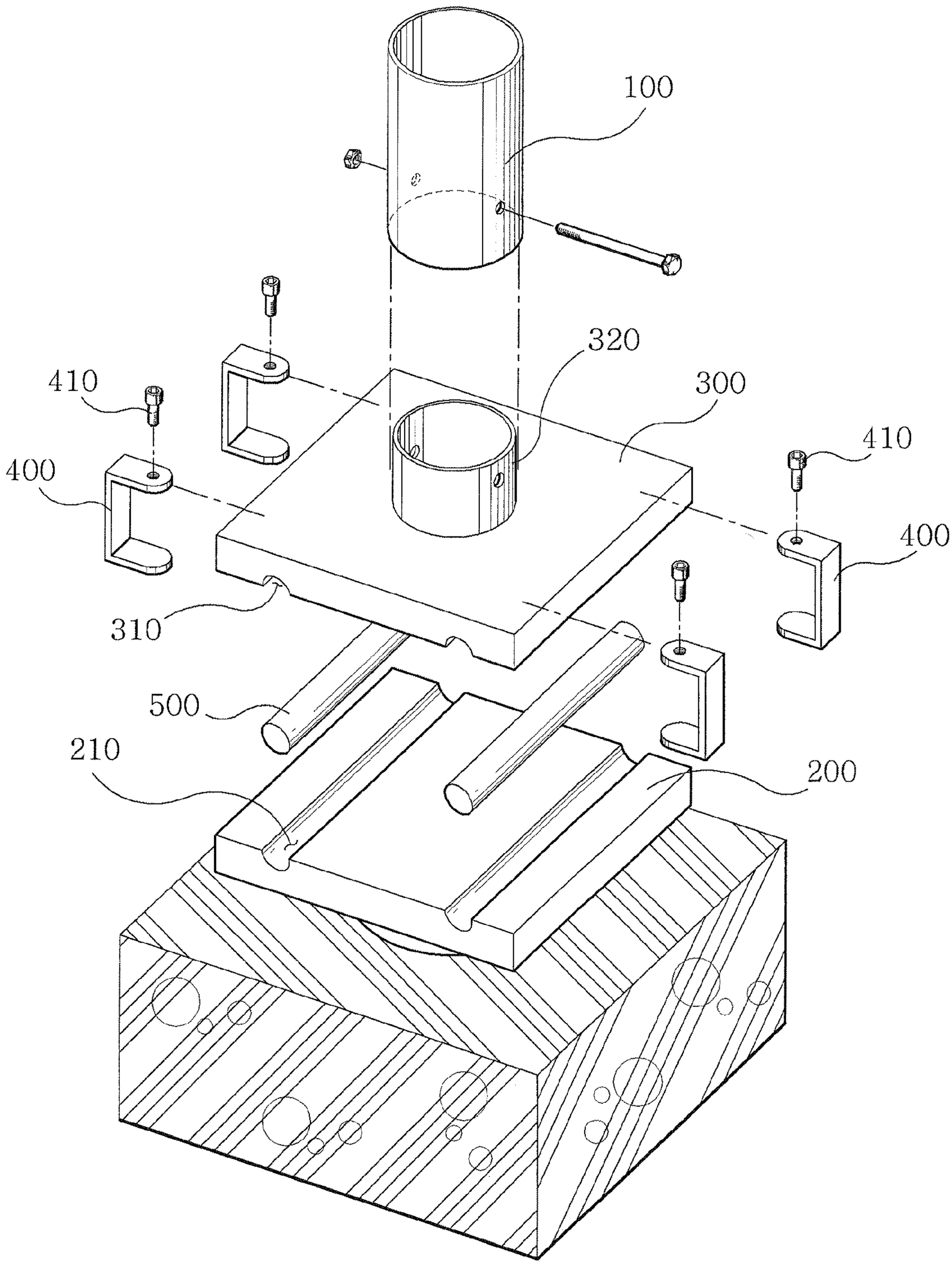


Fig.5

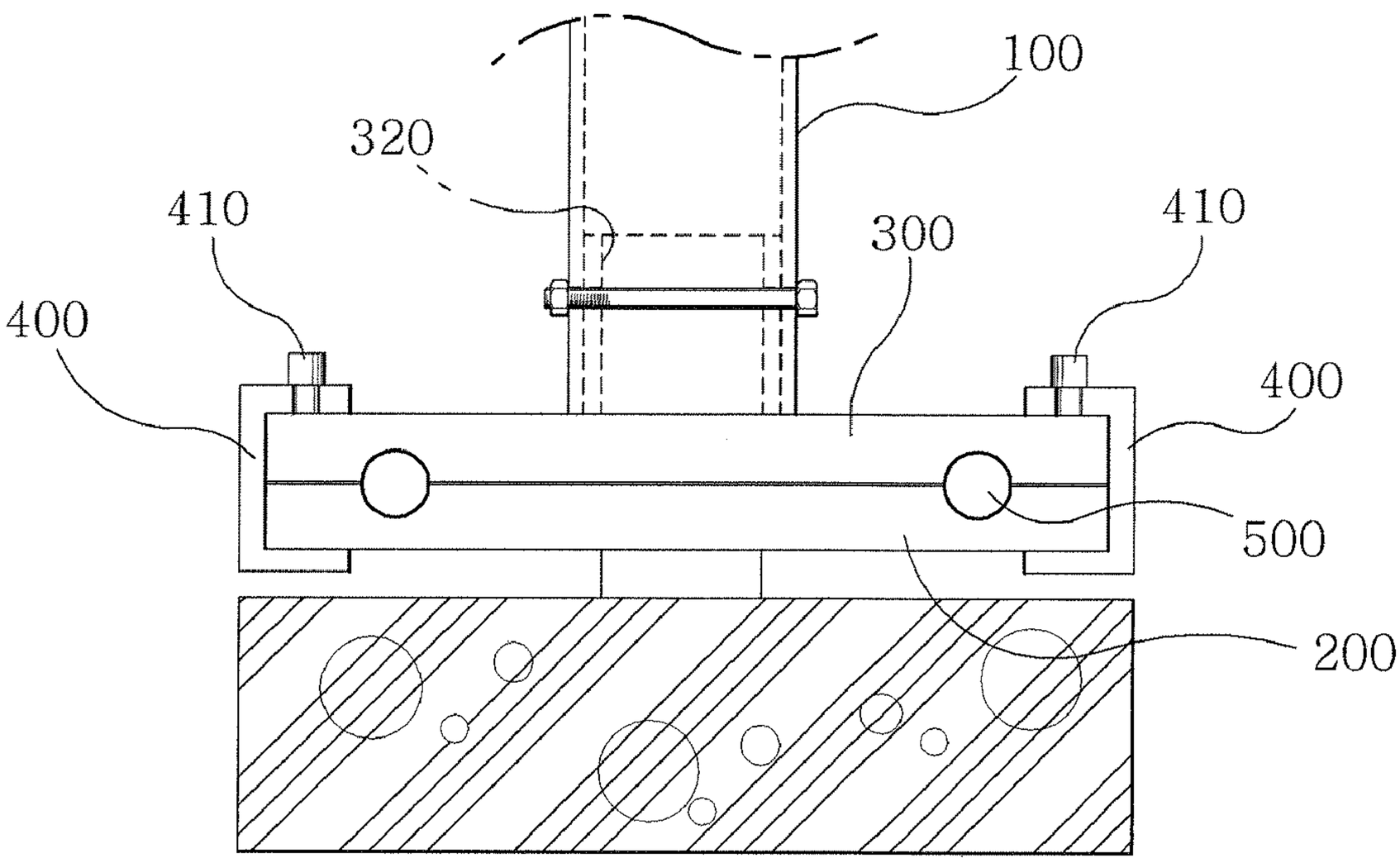


Fig.6

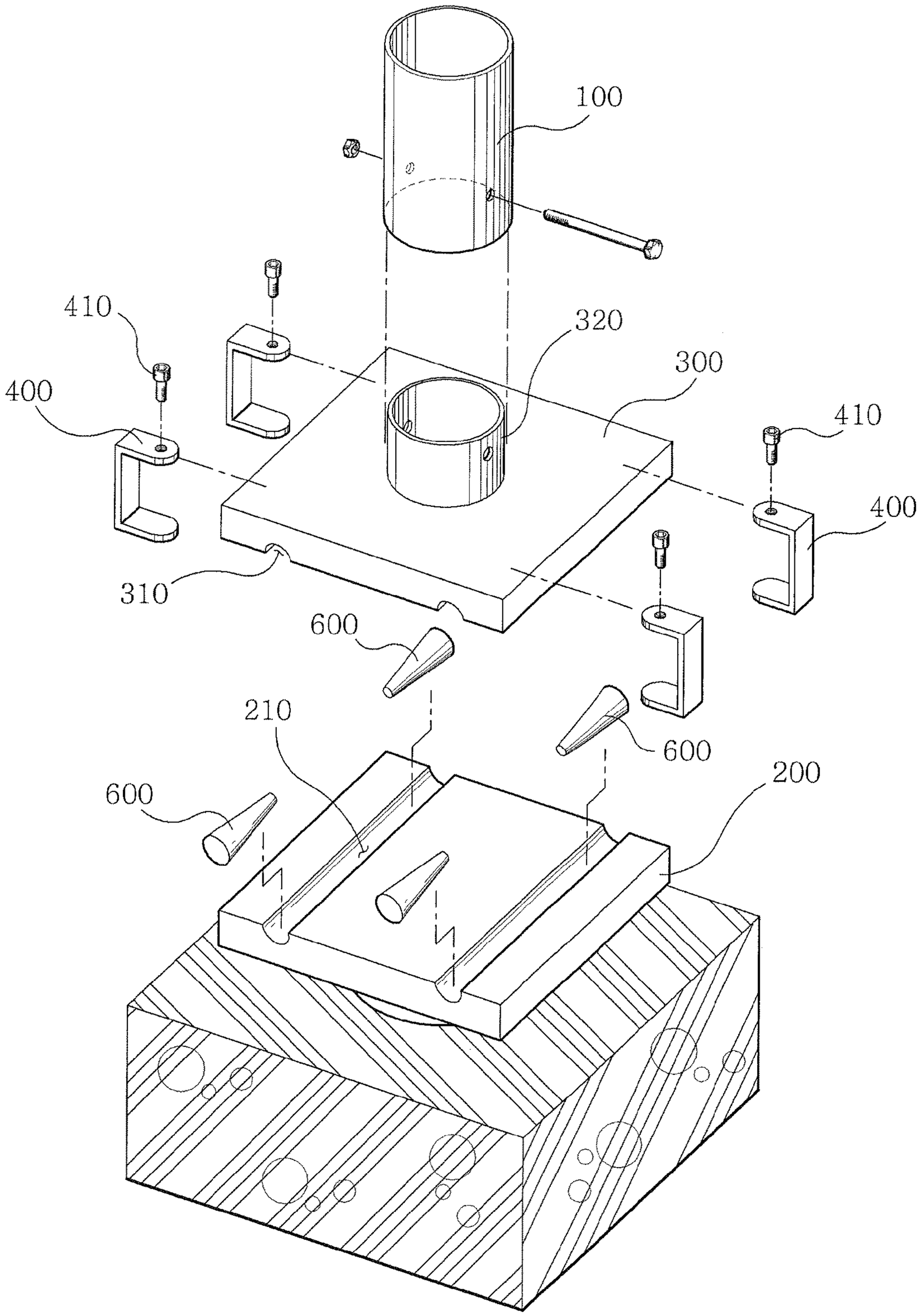


Fig.7A

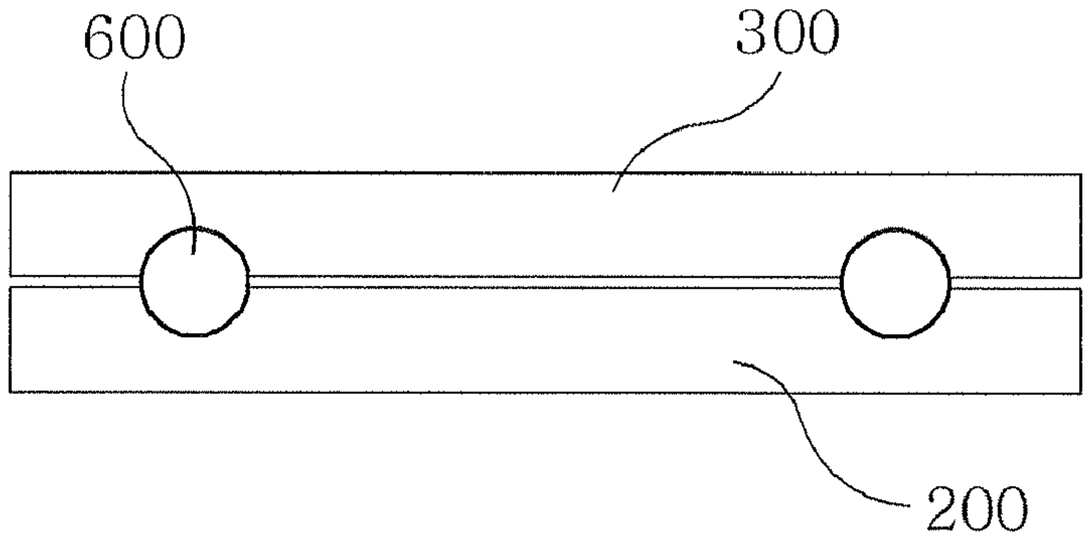


Fig.7B

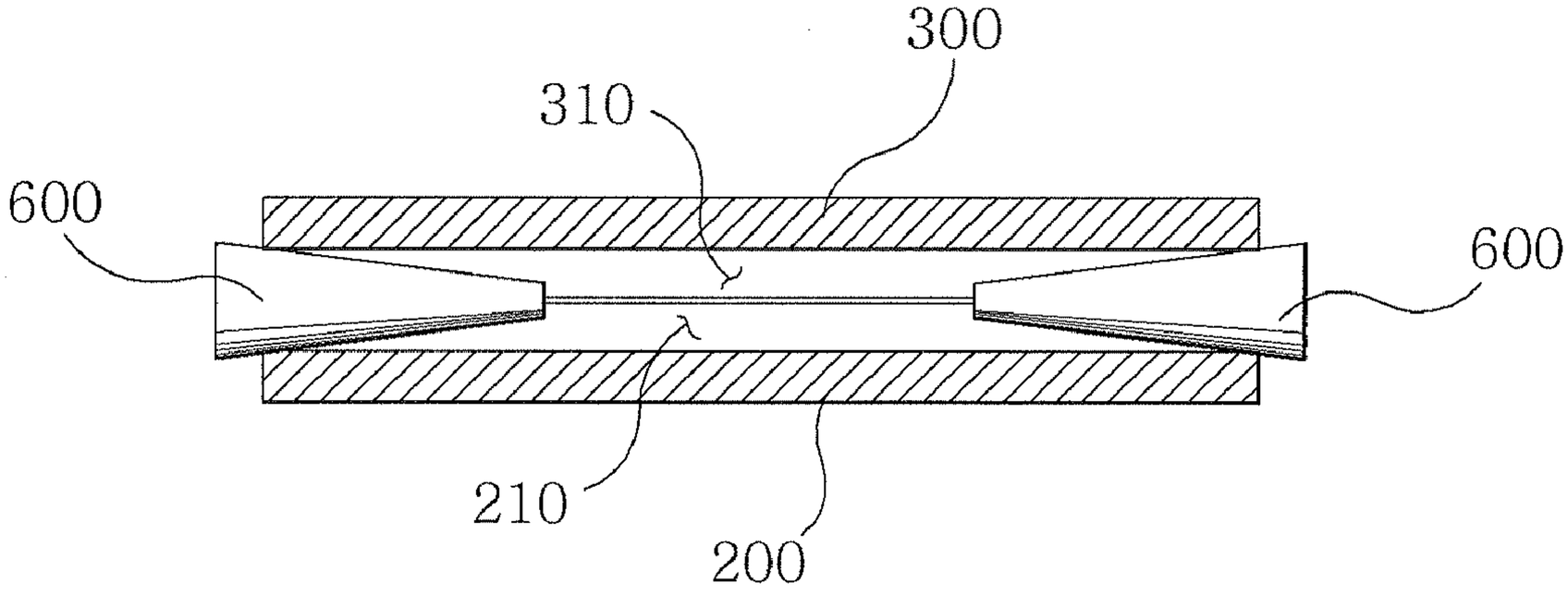


Fig.8

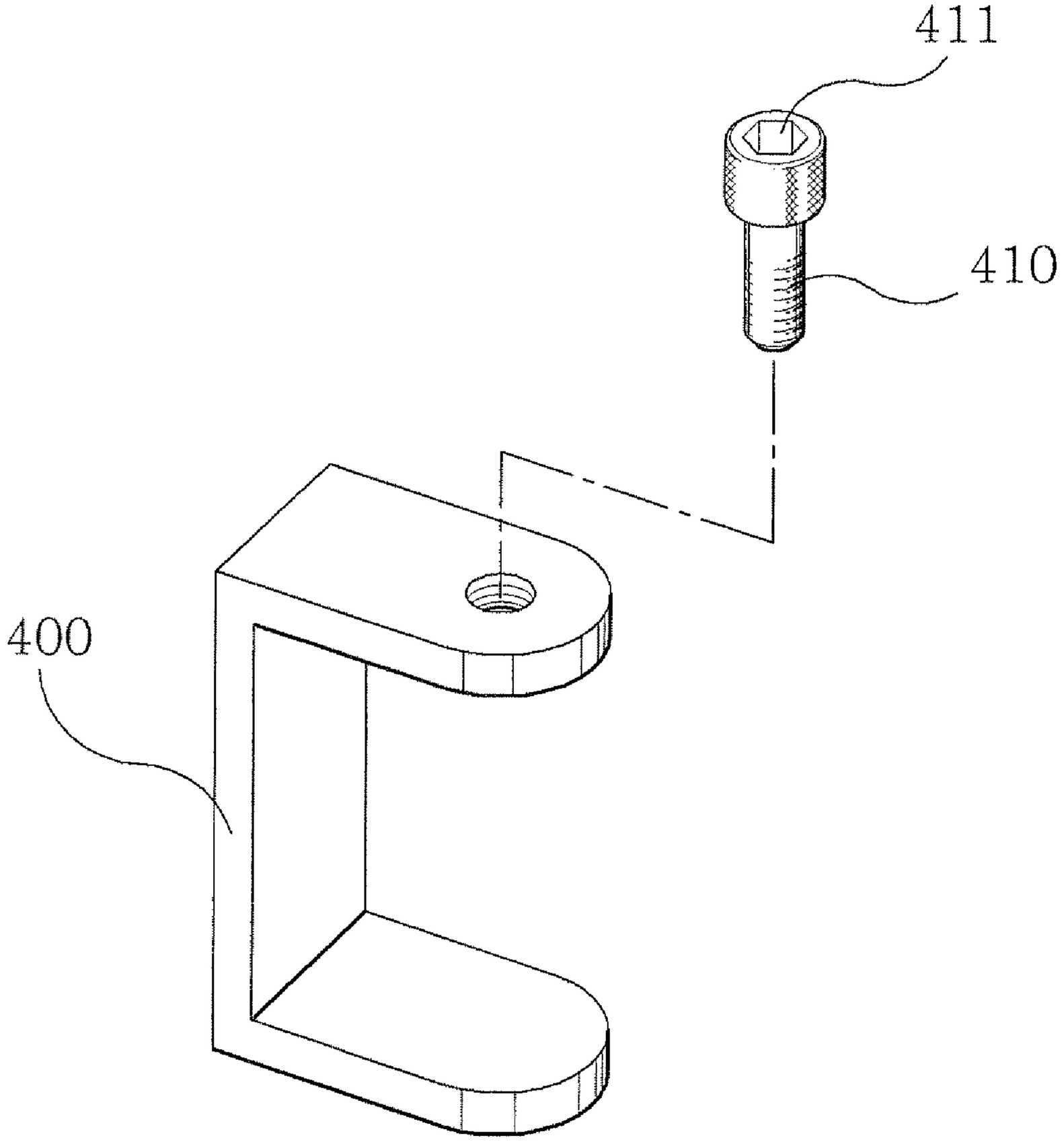


Fig.9A

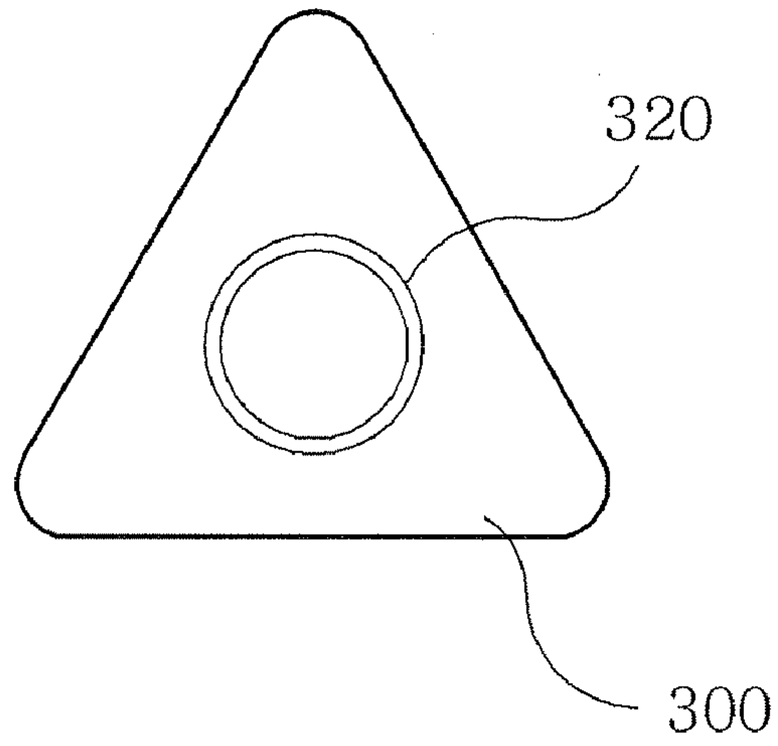


Fig.9B

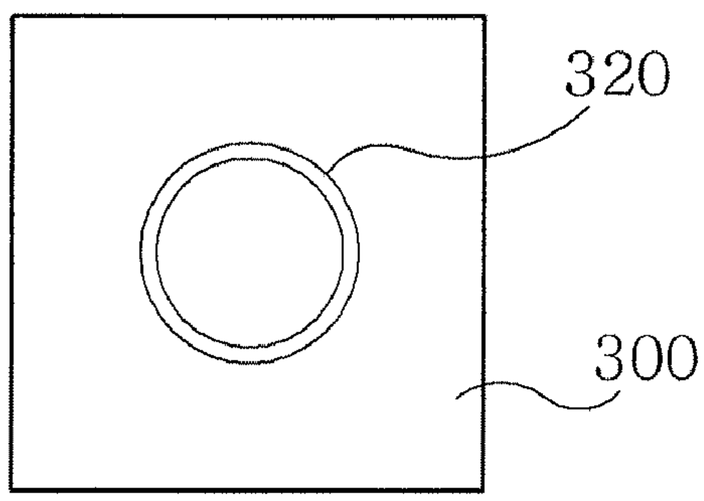
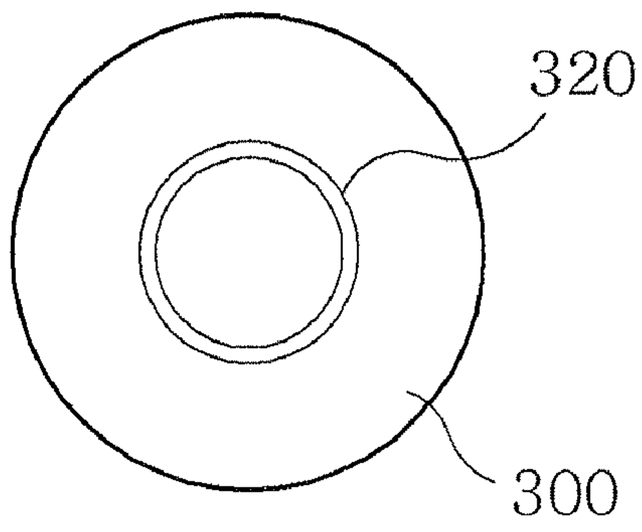


Fig.9C



SLIP BASE STRUCTURE WITH CLIP DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a structure for supporting a road support that is configured to allow a slip plate to separably slip from a base plate when a vehicle collides against the road support, thereby preventing a support body from being damaged, and more particularly, to a structure for supporting a road support that is configured to fasten a slip plate coupled integrally to a support body to a base plate disposed under the slip plate by means of a plurality of clips, such that the slip plate separably slips from the base plate when a vehicle collides against the road support, thereby minimizing an amount of impact between the vehicle and the road support, ensuring the safety of the passengers in the vehicle, and preventing or reducing the damage of the support body.

2. Background of the Related Art

Desirably, no installation for other structures except guide rails along the side of road is allowed so as to provide the safety of vehicles, but there is necessary equipment such as road signs, illuminating facilities, signal lamps, emergency telephones, electric poles, and the like, according to the functional or topographic conditions of the side of road. If a vehicle is deviated from the lane while the driver is driving in the state of dozing off at the wheel, under the influence, and in the state of being poor at driving, and alternatively, if the surface of road is slippery because of the snow, rain or ice covered thereon, the vehicle may collide against the equipment fixed along the side of road. Accordingly, there is a need for the safety projects for the fixed equipment on the side of road according to specific conditions for road, upon making the design for the road.

When a vehicle collides against a conventional small-sized road support, the road support is bent to fall toward the vehicle, so that the front window of the vehicle is broken into pieces to cause serious damages (that is, the injuries of the passengers in the vehicle) therefrom. Especially, if the road support has relatively high strength, the road support is bent and rather inserted into the inside of the vehicle than falling toward the vehicle, thereby causing a serious damage to the vehicle and failing to provide the safety of the passengers in the vehicle. So as to solve the above-mentioned problems, thus, if predetermined impact is applied to the road support, there is a need for separating the road support fixed on ground in such a manner as to be directed toward the advancing direction of the vehicle.

In other words, there is a definite need for a novel structure for supporting a road support wherein at normal cases the road support ensures its structural safety against wind load, but if vehicle collision occurs to apply a predetermined level of impact load to the road support, the lower end portion of the road support is separated from the ground, while absorbing a substantially quantity of the impact load thereto, thereby providing the safety of the passengers in the vehicle and at the same time minimizing the damages of the vehicle and the road support.

As shown in FIGS. **1**A and **1**B, there is a conventional structure for supporting a road support wherein a slip plate **300** to which a support body **100** is integrally coupled is placed on a base plate **200** fixed on ground, and a plurality of incised grooves **11** are formed along the edges of the slip plate **300** and the base plate **200**, such that the slip plate **300** and the base plate **200** are fastened to each other by means of the insertion of bolts and nuts into the incised grooves **11**.

In this manner, the slip plate **300** and the base plate **200** are fastened to each other just by means of the fastening force caused by the bolts and nuts, but even though the bolts and nuts are rigidly fastened, they may be loose while the road support is being exposed to wind pressure for a long period of time. To the contrary, if the bolts and nuts are excessively fastened, the slip plate **300** may be not separated from the base plate **200** when the vehicle collides against the road support.

Accordingly, there is a need for the development of a novel structure for supporting a road support which can maintain a stable coupling state between the slip plate and the base plate in normal states and can separate the slip plate from the base plate in a state where external impact over a predetermined level is applied to the road support.

SUMMARY OF THE INVENTION

Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the prior art, and it is an object of the present invention to provide a structure for supporting a road support that maintains a stable coupling state between a slip plate to which a support body is coupled integrally and a base plate fixed on ground in normal states during which wind load is applied, while separating the slip plate from the base plate in a state where external impact over a predetermined level caused by the collision against a vehicle is applied to the road support.

It is another object of the present invention to provide a structure for supporting a road support that provides a means for adjusting the inclination of a slip plate so as to erect a support body.

It is yet another object of the present invention to provide a structure for supporting a road support that effectively absorbs impact load applied thereto, thereby minimizing the damages of a vehicle and a driver and at the same time reducing the damage of a support body to increase the recycling effect of the support body.

To accomplish the above objects, according to the present invention, there is provided a structure for supporting a road support, the structure including: a base plate fixedly disposed on ground in such a manner as to be spaced apart by a predetermined distance from the surface of the ground; a slip plate slidably disposed on the top surface of the base plate; a coupling body protruded upwardly from the center portion of the top surface of the slip plate in such a manner as to be insertedly coupled to the inner lower end portion of a support body; and a plurality of clips having an approximately '⌐¬'-like shape so as to receive the edges of the base plate and the slip plate thereinto, each of the plurality of clips having a fixing bolt fastened to a female screw passed through the top end portion thereof so as to compressedly support the top surface of the slip plate.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments of the invention in conjunction with the accompanying drawings, in which:

FIGS. **1**A and **1**B are perspective and sectional views showing a conventional coupling structure between a slip plate and a base plate;

FIG. **2** is an exploded perspective view showing a structure for supporting a road support according to a first embodiment of the present invention;

FIG. **3** is a sectional view showing the structure for supporting a road support in FIG. **2**;

FIG. **4** is an exploded perspective view showing a structure for supporting a road support according to a second embodiment of the present invention;

FIG. **5** is a sectional view showing the structure for supporting a road support in FIG. **4**;

FIG. **6** is an exploded perspective view showing a structure for supporting a road support according to a third embodiment of the present invention;

FIGS. **7**A and **7**B are side and sectional views showing the structure for supporting a road support in FIG. **6**; and

FIG. **8** is an enlarged view showing a clip and a fixing bolt.

FIGS. **9**A, **9**B and **9**C are top views showing a slip plate.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, an explanation on a structure for supporting a road support according to the preferred embodiments of the present invention will be in detail given with reference to the attached drawings.

FIGS. **2** and **3** show a structure for supporting a road support according to a first embodiment of the present invention, FIGS. **4** and **5** show a structure for supporting a road support according to a second embodiment of the present invention, and FIGS. **6**, **7**A and **7**B show a structure for supporting a road support according to a third embodiment of the present invention.

According to the first embodiment of the present invention, there are no lower roller-receiving grooves **210**, upper roller-receiving grooves **310**, slip rollers **500** received between the lower roller-receiving grooves **210** and the upper roller-receiving grooves **310**, and taper rollers **600**. According to the second embodiment of the present invention, there are the lower roller-receiving grooves **210**, the upper roller-receiving grooves **310**, and the slip rollers **500**. According to the third embodiment of the present invention, there are the lower roller-receiving grooves **210**, the upper roller-receiving grooves **310**, and the taper rollers **600**.

According to the first embodiment of the present invention, as shown in FIGS. **2** and **3**, the structure for supporting a road support includes a base plate **200**, a slip plate **300**, a coupling body **320**, a plurality of clips **400**, and a plurality of fixing bolts **410**.

The base plate **200** is fixedly disposed on ground in such a manner as to be spaced apart by a predetermined distance from the surface of the ground, while serving to support the slip plate **300**.

Desirably, the base plate **200** has the same plane shape as the slip plate **300**.

As shown in FIGS. **9**A, **9**B and **9**C, the slip plate **300** has a variety of shapes such as triangle, square, round and the like, but of course, the slip plate **300** may have other shapes such as oval, diamond, trapezium and the like, which are not suggested in the drawing.

The coupling body **320** is protruded upwardly from the center portion of the top surface of the slip plate **300** in such a manner as to be insertedly coupled to the lower end portion of a support body **100**. As shown in FIG. **2**, if the diameter of the coupling body **320** is relatively small, the coupling body **320** is insertedly fit along the inner lower end periphery of the support body **100**, and alternatively, if the diameter of the coupling body **320** is relatively large, the inner lower end periphery of the support body **100** is insertedly fit along the inner periphery of the coupling body **320**.

It is not necessary that the support body **100** and the coupling body **320** have a round section, and therefore, they have various sectional shapes.

Furthermore, the support body **100** has a tube-like shape or a shape of H-beam. If the support body **100** has the shape of H-beam, the coupling body **320** desirably takes a shape of a square tube into which the support body **100** having the shape of H-beam is inserted.

As shown in FIG. **2**, the lower end periphery of the support body **100** and the coupling body **320**, which are insertedly coupled to each other, are fixed by means of a bolt and a nut passed through the support body **100** and the coupling body **320**. The fixing method is not limited to as suggested in FIG. **2**. That is, the bolt passed through the support body **100** may be fastened to a female screw provided on the coupling body **320**, and alternatively, the support body **100** and the coupling body **320** may be fixedly coupled to each other by means of a pin.

The plurality of clips **400** has an approximately '⊏'-like or 'C'-like shape so as to receive the edges of the base plate **200** thereinto, and generally, the number of clips **400** is three or more. The clips **400** are disposed along the edges of the base plate **200** and the slip plate **300** at predetermined intervals. The clips **400** should have appropriate size and strength of the material so as to exert a sufficient tensile force capable of supporting wind load moment.

The fixing bolts **410** are fastened to female screws passed through the top end portions of the clips **400** so as to compressedly support the top surface of the slip plate **300**, thereby preventing the slip plate **300** from being separated from the base plate **200** by the application of wind load. Further, the fixing bolts **410** serve to fix the clips **300** to the base plate **200**.

As shown in FIG. **3**, if the fixing bolts **410** are fastened to the clips **400** in the state where the edges of the base plate **200** and the slip plate **300** are received into the inside of the clips **400**, the base plate **200** and the slip plate **300** disposed between the fixing bolts **410** and the lower end portion of the clips **400** are compressed such that the slip plate **300** is fixedly disposed on the top surface of the base plate **200**.

As shown in FIG. **8**, as the fixing bolt **410** is fastened to the clip **400**, the top end portion of the clip **400** is finely opened from the lower end portion thereof, thereby generating tension (elastic force) therebetween. The generation of the tension prevents the fixing bolt **410** from being loose and at the same time allows the base plate **200** and the slip plate **300** to be fixedly fastened to each other through an appropriate force applied thereto.

Therefore, in normal cases the coupling relation between the slip plate **300** coupled integrally to the support body **100** and the base plate **200** fixed on the ground is stably maintained, and in some cases where impact load caused by the occurrence of the collision against a vehicle is more than a predetermined value, the slip plate **300** separably slips from the base plate **200**, thereby minimizing the damages of the vehicle and the support body **100**.

The fixing bolt **410** may be formed of a hex bolt having a generally hexagonal head portion, and as shown in FIG. **8**, the fixing bolt **410** has a wrench-receiving portion **411** formed on the top surface of a round head portion, the wrench-receiving portion **411** being concave to a hexagonal shape. In this case, generally, the fixing bolt **410** is fastened to the clip **400** by means of a hex wrench, but it is not necessary to form the section of the wrench-receiving portion **411** to the hexagonal shape. That is, the wrench-receiving portion **411** may be formed to a square or other polygonal shapes. In this case, the wrench having the corresponding sectional shape to the wrench-receiving portion **411** is used to fasten the fixing bolt **410** to the clip **400**.

FIGS. **4** and **5** show the second embodiment of the present invention, wherein the explanation on the same parts as in the

first embodiment of the present invention will be avoided and the explanation on the different parts will be given.

According to the second embodiment of the present invention, the lower roller-receiving grooves **210** are formed spaced apart from each other on the top surface of the base plate **200** along the direction of length of the base plate **200**, each having an arc-shaped section, and the upper roller-receiving grooves **310** are formed spaced apart from each other on the underside surface of the slip plate **300** to correspond with the lower roller-receiving grooves **210**, each having an arc-shaped section.

Thus, when the base plate **200** and the slip plate **300** are coupled to each other, the lower roller-receiving grooves **210** and the upper roller-receiving grooves **310** form cylindrical space portions into which the cylindrical slip rollers **500** are inserted.

In addition to the fixing through the clips **400**, when the slip rollers **500** are mounted, the sectional structure is made as shown in FIG. **5**, such that in normal cases the coupling relation between the slip plate **300** and the base plate **200** is stably maintained and in the case where the collision against the vehicle occurs the slip plate **300** is slidingly moved along the slip rollers and smoothly separated from the base plate **200**.

FIGS. **6**, **7**A and **7**B show the third embodiment of the present invention, wherein the explanation on the same parts as in the second embodiment of the present invention will be avoided and the explanation on the different parts will be given.

The third embodiment of the present invention is almost same as the second embodiment of the present invention, except that the slip rollers **500** are replaced with the taper rollers **600**.

That is, in the same manner as the second embodiment of the present invention, the lower roller-receiving grooves **210** and the upper roller-receiving grooves **310** form cylindrical space portions into which the taper rollers **600** each having a taper pin-like shape are inserted.

According to the insertion depths of the taper rollers **600**, the slip plate **300** placed on the top surface of the base plate **200** is adjusted in height, such that the horizontal inclination of the slip plate **300** is controlled to allow the support body **100** to be erected.

In other words, as the taper rollers **600** are deeply inserted into the inside space portions between the upper roller-receiving grooves **310** and the lower roller-receiving grooves **210**, the height of the slip plate **300** becomes high (which causes the distance between the top surface of the slip plate **300** and the underside surface of the base plate **300** to be long), and contrarily, as the lengths of the taper rollers **600** exposed to the outside are long, the height of the slip plate **300** becomes low.

Accordingly, as shown in FIG. **6**, as the insertion lengths of the taper rollers **600** into the four side edges of the slip plate **300** are adjusted, the horizontal inclination of the slip plate **300** is adjusted, which permits the vertical inclination of the support body **100** coupled integrally to the slip plate **300** to be adjusted, thereby erecting the support body **100**.

As described above, the structure for supporting the road support according to the present invention can maintain a stable coupling state between the slip plate to which the support body is coupled integrally and the base plate fixed on the ground in normal states during which wind load is applied, while separating the slip plate from the base plate in a state where external impact over a predetermined level caused by the collision against a vehicle is applied to the road support.

In other words, the structure for supporting the road support according to the present invention can maintain the stable coupling state between the slip plate and the base plate by means of the fastening of the clips effectively resisting the wind load applied to the road signs and the road support in normal states, and can separate the slip plate from the base plate, while appropriately absorbing the impact load applied to the road support in the state where vehicle collision occurs, thereby minimizing the damage of the vehicle and improving the safety of the passengers in the vehicle.

Additionally, the structure for supporting the road support according to the present invention can easily adjust the inclination of the slip plate so as to erect the support body.

In other words, since the taper rollers insertedly disposed at three or four edges of the slip plate are adjusted in the lengths of the insertion into the slip plate, the horizontal inclination of the slip plate can be adjusted.

The structure for supporting the road support according to the present invention can effectively absorb impact load applied thereto, thereby minimizing the damages of a vehicle and a driver and at the same time reducing the damage of a support body to increase the recycling effect of the support body.

While the present invention has been described with reference to the particular illustrative embodiments, it is not to be restricted by the embodiments but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the present invention.

What is claimed is:

1. A structure for supporting a road support, the structure comprising:

a base plate fixedly disposed on ground in such a manner as to be spaced apart by a predetermined distance from the surface of ground;

a slip plate slidably disposed on the top surface of the base plate;

a coupling body protruded upwardly from the center portion of the top surface of the slip plate in such a manner as to be insertedly coupled to the inner lower end portion of a support body; and

a plurality of clips each having an approximately '⊏' or 'C'-like shape so as to receive the edges of the base plate and the slip plate thereinto, each of the plurality of clips having a fixing bolt fastened to a female screw passed through the top end portion thereof so as to compressedly support the top surface of the slip plate;

lower roller-receiving grooves formed spaced apart from each other on the top surface of the base plate along the direction of length of the base plate, each of the lower roller-receiving grooves having an arc-shaped section;

upper roller-receiving grooves formed spaced apart from each other on the underside surface of the slip plate to correspond with the lower roller-receiving grooves, each of the upper roller-receiving grooves having an arc-shaped section; and

cylindrical slip rollers adapted to be inserted into space portions formed between the lower roller-receiving grooves and the upper roller-receiving grooves by the coupling of the base plate and the slip plate.

2. The structure for supporting a road support according to claim **1**, wherein the fixing bolt has a wrench-receiving portion formed on the top surface thereof, the wrench-receiving portion being concave to a shape of a polygonal section so as to insert a wrench thereinto.

3. A structure for supporting a road support, the structure comprising:

a base plate fixedly disposed on ground in such a manner as to be spaced apart by a predetermined distance from the surface of ground;

a slip plate slidably disposed on the top surface of the base plate;

a coupling body protruded upwardly from the center portion of the top surface of the slip plate in such a manner as to be insertedly coupled to the inner lower end portion of a support body;

a plurality of clips each having an approximately '⊏' or 'C'-like shape so as to receive the edges of the base plate and the slip plate thereinto, each of the plurality of clips having a fixing bolt fastened to a female screw passed through the top end portion thereof so as to compressedly support the top surface of the slip plate;

lower roller-receiving grooves formed spaced apart from each other on the top surface of the base plate along the direction of length of the base plate, each of the lower roller-receiving grooves having an arc-shaped section;

upper roller-receiving grooves formed spaced apart from each other on the underside surface of the slip plate to correspond with the lower roller-receiving grooves, each of the upper roller-receiving grooves having an arc-shaped section; and

taper rollers each having a taper pin-like shape adapted to be inserted into space portions formed between the lower roller-receiving grooves and the upper roller-receiving grooves by the coupling of the base plate and the slip plate.

4. The structure for supporting a road support according to claim **3**, wherein the fixing bolt has a wrench-receiving portion formed on the top surface thereof, the wrench-receiving portion being concave to a shape of a polygonal section so as to insert a wrench thereinto.

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